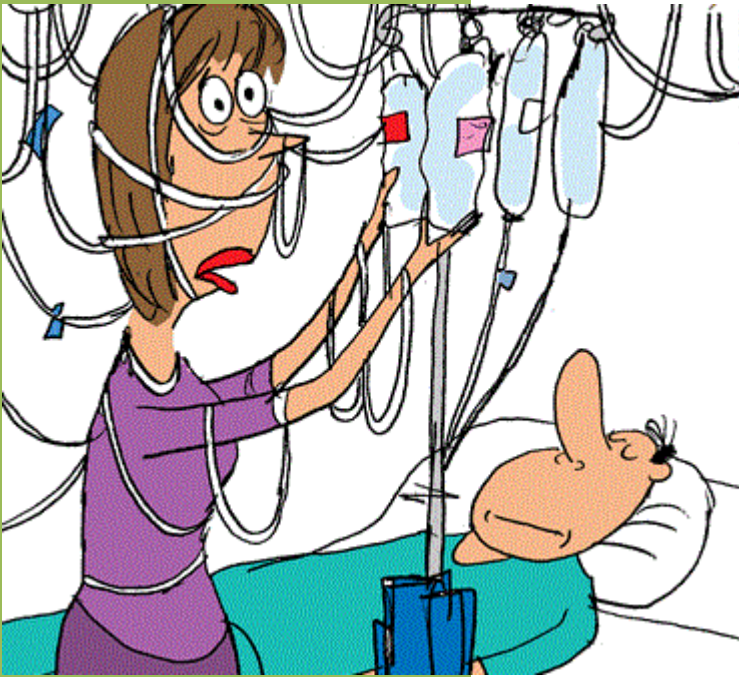


Drug Infusions in ICU made ridiculously simple



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"You fast guide for drug infusions in ICU"

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" June 2016"

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Adrenaline

Strength	1mg / 1ml	
Compatibility	NS, D5W. don't mix with sodium bicarbonate	
Uses	Dose	Infusion rate
	0.04–1 mcg/kg/minute -N.B. doses <0.3 mcg/kg/minute generally produce beta-adrenergic effects -higher doses (>0.3 mcg/kg/minute) generally produce alpha-adrenergic vasoconstriction	-5 amp * 50 ml → 1.5-42 ml/hr. (very high doses for refractory hypotension) *NB: 1 ml =100 mcg
Stability	• 24 hr. • Epinephrine is sensitive to light and air; protection from light is recommended. • Oxidation turns drug pink, then a brown color; • Solutions should not be used if they are discolored or contain a precipitate.	
Precautions	❖ Central line required for administration	

Alteplase (tPA)

Strength		20 mg (after reconstitution 1mg/ml)	
Compatibility		NS, sterile water for injection	
Uses		Dose	Infusion rate
	STEMI	-100 mg over 1.5 hour. (administered as a 15 mg I.V. bolus over 1-2 minutes followed by infusions of 50 mg over 30 minutes, then 35 mg over 1 hour)	15 ml I.V. bolus over 1-2 minutes then 50 ml over 30 minutes, then 35 ml over 1 hour
	PE	-100 mg over 2 hours. (administered as a 10 mg bolus followed by 90 mg over 2 hours)	10 ml bolus then 90 ml over 2 hours
	acute ischemic stroke	-0.09 mg/kg (max 9mg) as an I.V. bolus over 1 minute, followed by 0.81 mg/kg (max 81mg) as a continuous infusion over 60 minutes.	9ml bolus over 1 minute then 81ml over 60 minutes
	peripheral arterial occlusion (intra-arterial) (Unlabeled)	- <i>Weight-based regimen</i> : 0.001-0.02 mg/kg/hour (maximum dose: 2 mg/hour) OR - <i>Fixed-dose regimen</i> : 0.12-2 mg/hour Duration :-6-48 hours according to size and allocation of thrombus	.12-2 ml/hour for 6-48 hours
	prosthetic valve thrombosis (Unlabeled Use)	- <i>High-dose regimen</i> : Load with 10 mg, followed by 90 mg over 90-180 minutes (without heparin during infusion) . - <i>Low-dose regimen</i> (preferred for very small adults): Load with 20 mg, followed by 10 mg/hour for 3 hours (without heparin during infusion) .	-10 ml bolus, then 90 mg over 90-180 minutes OR -For Low weight adult →20 ml, then 10 ml/hour for 3 hours
Stability		• Use within 8 hrs. (at temp 2-30 C), • Discard unused portion	
Precautions		❖ Reconstitute the powder with sterile water for injection to give 1mg/ml ❖ →let stand undisrupted for several minutes (to allow large bubbles to dissipate) ❖ →Mix by gentle swirling or slow inversion ,Do Not shake. *NB:-May be further diluted with equal volume of NS to yield →.5mg/ml	

Aminophylline

Strength	125 mg /5 ml	
Compatibility	D ₅ W, NS	
Uses	Dose	Infusion rate
	-5mg/kg then .5 mg /kg/hr (use lower infusion rates i.e.<21mg/hr FOR :- pt >60y / Cor pulmonale / cardiac decompensation / liver dysfunction)	3 amp * 350ml NS over 30 minutes then 1amp*125 ml Ns →35 ml/hr
Stability	Use prepared infusions immediately; change every 24 hours	
Precautions	❖ Adults 16-60 years →maximum daily dose: aminophylline 1139 mg/day (equivalent to theophylline 900 mg/day) ❖ Adults >60 years →maximum daily dose: aminophylline 507 mg/day ❖ Patients currently receiving aminophylline or theophylline: A loading dose is not recommended without first obtaining a serum theophylline concentration .	

Amiodrone

Strength		150 mg/Amp	
Compatibility		D5W	
Uses		Dose	Infusion rate
	AF cardioversion	Loading: 5–7 mg/kg IV over 30–60 minutes, then 1.2–1.8 g/day continuous IV OR divided oral doses until 10 g. Maintenance: - 200–400 mg/day PO -100 mg/day for the elderly or low body mass	3 amp *250 ml → over 30-60min Then then 1.2–1.8 g/ day continuous IV or divided oral doses until 10 g
	AF rate control (unlabeled)	300 mg over 1 hr then 10-50mg/hr over 24 hrs. Followed by 100-200mg/day as maintenance	2 amp*150 ml → over 1hr Then 6 amp*500ml → 5.5 ml-27ml /hr. for 24 hr.
	Stable VT or SVT	First 24 hours: 1050 mg according to following regimen :- -150 mg *100ml D5W over first 10 minutes. -Then 360 mg *200ml D5W over next 6 hours =1 mg/minute -Then 540 mg *300ml D5W over next 18 hours = 0.5 mg/minute -Then 800mg /day for 1 month then Maintenance for VT: 400 mg/day	1 amp*100ml → over 10 min Then 6 amp*500ml → 34 ml/hr for 6 hrs Then 17 ml /hr for 18 hrs
Stability		• 24 hr	
Precautions		❖ High drug concentration > 3mg/ml associated with vein phlebitis. ❖ For infusion >1hr do not exceed 2mg/ml	

Atracurium

Strength		50 mg /5ml	
Compatibility		Stable in D ₅ W, D ₅ NS incompatible with LR variable: NS	
Uses		Dose	Infusion rate
	ICU paralysis (eg, facilitate mechanical ventilation) in selected adequately sedated patients	Bolus of 0.4 - 0.5 mg/kg, followed by 0.24 - 1.2 mg/kg/hour	amp*100ml → 70 ml bolus followed by 33 – 168 ml/hr
Stability		24 hours	
Precautions			

Dexmedetomidine (precdx)

Strength		200 mcg/2 mL	
Compatibility		D ₅ W, LR, NS	
Uses		Dose	Infusion rate
	Loading infusion	1 mcg/kg over 10 minutes	Amp *50ml→17 ml over 10 minutes
	Maintenance infusion	0.2 to 1.4 mcg/kg/hour	3.5 – 25 ml/hr
Stability		• 24 hours	
Precautions		❖ Use of infusions >24 hours has been associated with tolerance and tachyphylaxis and dose-related increase in adverse reactions. ❖ Use for >24 hours is not recommended by the manufacturer and if so you must withdraw it gradually	

Diazepam

Strength		5 mg /ml amp is 2 ml	
Compatibility		Administer undiluted by slow IV push	
Uses		Dose	Infusion rate
	Sedation	Loading dose: 5 to 10 mg; Maintenance dose: 0.03 to 0.1 mg/kg every 30 minutes to 6 hours	Loading dose: 5 to 10 mg then 2-7 mg every 0.5-6hr
	Status epilepticus	-0.15 mg/kg (up to 10 mg/dose) at rate of up to 5 mg/minute. -May repeat every 5 minutes	Loading dose: 5 to 10 mg May repeat every 5 minutes
Stability			
Precautions		❖ Do not administer through small veins (eg, dorsum of hand/wrist) ❖ Rapid injection may cause respiratory depression or hypotension so administer < 5 mg / min	

Dobutamine

Strength		250 mg / 20 ml	
Compatibility		D5W, NS	
Uses		Dose	Infusion rate
		2–20 mcg/kg/minute	1 amp * 50 ml → 1.6 -17 ml/hr. ~(2-20 ml /hr.)
Stability		• 24 hours	
Precautions		❖ Some literature state that maximum dose is 40mcg/kg/min ❖ But ACC/AHA and SCCM recommend maximum dose of 20mcg/kg/min	

Dopamine

Strength		200 mg /5ml	
Compatibility		D5W, NS	
Uses		Dose	Infusion rate
		1 amp * 50 ml	
	Dopa dose	1-3mcg/kg/min	1-3 ml/hr.
	Beta dose	4- 10mcg/kg/min	4 - 10.5 ml/hr.
	Alpha dose	>10mcg/kg/min	>10.5 ml/hr.
Stability		• 24 hours • Protect from light, don't use if darker than slightly yellow	
Precautions		❖ Do not use low-dose dopamine for <u>renal</u> protection because evidence does <u>not support</u> this practice. ❖ doses >20 mcg/kg/minute may not have a beneficial effect on blood pressure and increase the risk of tachyarrhythmias. ❖ infusion may be increased by 1-4 ml at 10- to 30-minute intervals until optimal response is obtained.	

Fentanyl

Strength		50 mcg/ml amp=2ml	
Compatibility		D ₅ W, NS.	
Uses		Dose	Infusion rate
	Intermittent dosing	0.35 to .5 mcg/kg IV every 0.5 to 1 hour	amp *10ml NS → 3-4 ml over 2 min every 0.5 to 1 hour
	Continuous infusion	0.7 to 10 mcg/kg/hr IV	5 amp*50ml → 6-84ml / hr
Stability		• 24 hours	
Precautions		❖ May cause respiratory depression even when used as recommended so <i>monitor closely</i>	

Heparin

Strength		5000 IU /amp	
Compatibility		NS	
Uses		Dose	Infusion rate
	ACS	60 units/kg (maximum: 4000 units), then 12 units/kg/hour (maximum: 1000 units/hour)	1 amp bolus then 5 amp * 50ml NS→1.8 ml/hr.
	VTE	80 units/kg (or alternatively 5000 units) I. then 18 units/kg/hour (or alternatively 1000 units/hour) OR SC 333 units/kg then 250 units/kg every 12 hours	1 amp bolus then 5 amp * 50ml NS→2.7 ml/hr.
	Intermittent I.V. Anticoagulation	10,000 units, then 50-70 units/kg (5000-10,000 units) every 4-6 hours	2 amp bolus then 1-2 amp /4-6 hr
Stability		• 24 hr.	
Precautions		❖ Slight yellow coloration does not affect potency	

Ketamine

Strength		50 mg/vial	
Compatibility		D ₅ W, NS	
Uses		Dose	Infusion rate
	For sedation and analgesia (Micromedx)	0.2 to 0.75 mg/kg over 2 to 3 minutes, followed by continuous infusion of .3-1.2 mg/kg/hr.	amp*50ml → 15-50 ml over 2 to 3 minutes then 20-84 ml/hr. *My dilute the amp in 25 ml in patients with fluid restrictions
	Critically ill patients (as an adjunct to an opioid analgesic for non-neuropathic pain)	0.1 to 0.5 mg/kg bolus over 2 to 3 minutes; followed by a continuous infusion 0.05 to 0.4 mg/kg/hour	amp*50ml NS→ 8 -35 ml over 2 to 3 minutes then 3- 28 ml/hr.
	Procedural sedation/analgesia (off-label use)	1 to 2 mg/kg (usual adult dose: 100 mg) over 2 to 3 minutes; may administer incremental doses of 0.5 to 1 mg/kg every 5 to 15 minutes as needed	2amp*100ml NS→ 70-100 ml over 2 to 3 minutes then may administer 40-80 ml every 5 to 15 minutes as needed
Stability		24 hours	
Precautions			

Lidocaine

Strength		20 mg/ ml * 50ml = 1000mg	
Compatibility		D ₅ W	
Uses		Dose	Infusion rate
	Stable VT (with a pulse)	1–1.5 mg/kg IVP repeat 0.5–0.75 mg/kg every 3–5 minutes (maximum 3 mg/kg) then 1–4 mg/minute (14-57 mcg/kg/minute) as maintenance .	3-5ml iv bolus , repeat 1.5-2.5 ml /3-5 min (max. 11 ml) then 1 amp*250 ml →15-60 ml/hr.
	Pulseless VT/VF conversion	1–1.5 mg/kg IVP over 3 min; repeat 0.5–0.75 mg/kg every 3–5 minutes (maximum 3 mg/kg)	3-5ml iv bolus , repeat 1.5-2.5 ml /3-5 min (max. 11 ml)
Stability		• 24 hours	
Precautions		❖ Reduce bolus dose to 0.5–0.75 mg/kg IVP If LVEF < 40% ❖ Reduce maintenance infusion in patients with CHF, shock, or hepatic disease→ initiate infusion at 10 mcg/kg/minute (maximum dose: 1.5 mg/minute or 20 mcg/kg/minute). ❖ DO not give IV infusion Lidocaine at conc > 4 mg/ml <u>except</u> for fluid restriction can give up to 8 mg/ml. ❖ IV bolus can be given undiluted. ❖ Too rapid infusion can cause seizures.	

Levosimendan

Strength		25 mg/10ml	
Compatibility		D5W	
Uses ADHF - Septic shock - CCB toxicity		Dose	Infusion rate
	Loading dose	6-12 mcg/kg over 10 minutes	1 amp *500 ml → 8.5-17 ml over 10 min. *NB: 1 ml=50mcg
	Maintenance dose	0.05-0.2 mcg/kg/minute (for 24 hr as a recommended duration)	1 amp *500 ml → 4.2 – 17 ml/hr.
Stability		24 hr. in refrigerator	
Precautions		❖ Should not be used in pt with severe hypotension ,tachycardia or with mechanical obstruction affecting ventricular filling or outflow. ❖ Avoid in pt with severe renal or hepatic impairment and pt with history of torsade de point.	

Midazolam

Strength		5 mg /ml (2 ml)	
Compatibility		D ₅ W, NS incompatible with LR.	
Uses		Dose	Infusion rate
	Sedation	<u>Initial dose</u> : 0.5 to 4 mg repeat at 5- to 15-minute intervals until adequate sedation achieved. <u>maintenance infusion</u> : 0.02 to 0.1 mg/kg/hour OR Start at 1 mg/hour and titrate to goal.	Initial dose: 0.5 to 4 mg over 2 min then 5 amp *50ml→1.4 ml to 7 ml /hr
	Status epilepticus	IM: 10 mg once Preferred for <i>intramuscular</i> administration	
	Refractory Status epilepticus	<u>Loading dose</u> : 0.2 mg/kg then <u>Continuous infusion</u> : 0.05 to 2 mg/kg/hour <u>Titrated to</u> cessation of seizures <u>If breakthrough</u> while on the continuous infusion, administer a <u>bolus</u> of 0.1 to 0.2 mg/kg and <u>increase infusion</u> rate by 0.05 to 0.1 mg/kg/hour	1 amp bolus over 5 min. then 5 amp *50ml→3.5 ml – 140 ml /hr.
Stability		24 hours .	
Precautions		❖ Withdraw gradually to prevent recurrent status epilepticus.	

Milrinone (Primacor)

Strength		10 mg /10ml	
Compatibility		D5W, NS	
Uses		Dose	Infusion rate
	Loading dose	50 mcg/kg over 10 min	1 amp * 50 ml → 17.5 ml over 10 min
	Maintenance dose	0.375-0.75 mcg/kg/minute	1 amp * 50 ml → 7.5 – 15 ml/hr NB: 1ml=200mcg
Stability		Stable for 72 hr at room temp in normal light	
Precautions		❖ Use lower doses in renal failure ❖ Cause Vasodilation and hypotension, arrhythmias so Loading doses often omitted especially if patient hypotensive	

Morphine

Strength		10 mg /ml , amp=2ml	
Compatibility		D ₅ W, NS	
Uses		Dose	Infusion rate
	Intermittent dosing	0.01 to 0.15 mg/kg IV every 1 to 2 hours NB:- in MI repeat dose every 5 to 15 minutes as needed	amp*20ml NS → 1-10ml over 4 to 5 min. every 1-2hr or 5-15min in MI
	Continuous infusion	0.07 to 0.5 mg/kg/hr IV	5amp*100 → 5-35ml/hr.
Stability		24 hours	
Precautions			

Nitroglycerine

Strength	50 mg/50ml	
Compatibility	D5W	
Uses	Dose	Infusion rate
	5- 200 mcg/minute (increase by 5 mcg/minute every 5 min) *Typical dose in HF 25–75 mcg/minute	10 ml thick + 40ml → 1.5 – 60 ml 1ml=200mcg
Stability	• 24 hr.	
Precautions	❖ venous vasodilator> arterial vasodilator ❖ arterial vasodilation at high doses(e.g., 100 mcg/minute) ❖ tachyphylaxis occur within 24-48hr so give nitrate <u>free interval</u> (10-12 hr /day)	

Nitroprusside

Strength		50 mg/2ml	
Compatibility		D5W	
Uses		Dose	Infusion rate
		0.2 - 10 mcg/kg/minute NB: Doses >5 mcg/kg/minute are not recommended	50 mg*250 ml D5W → 4.2 – 210 ml/hr.
Stability		• Solution of nitroprusside may be light brown , light orange → use it if clear • While blue ,green, dark red or solution with particulate → not use as this indicate decomposition • Prepare it away from light • Prepared solution should be wrapped immediately with aluminum foil or other opaque material to protect from light and use within 24 hr	
Precautions		❖ Can cause cyanide or thiocyanate toxicity so use with caution in hepatic or renal impairment ❖ When administered in doses >3 mcg/kg/minute for prolonged periods of time (eg, 3-4 days), thiocyanate levels should be monitored daily ❖ Doses >5 mcg/kg/minute give minimal added benefit and increased risk for thiocyanate toxicity ❖ Solution must be further diluted with 5% dextrose in water. ❖ Do not administer by direct injection.	

Noradrenaline

Strength		8 mg / 4ml	
Compatibility		D5W	
Uses		Dose	Infusion rate
		0.01–3 mcg/kg/minute	1 amp * 50 ml → .25 - 80 ml /hr.
Stability		• 24 hr. • keep away from light ,don't use if brown coloration (oxidized), • not stable with sodium bicarbonate	
Precautions			

Phenytoin

Strength		250 mg	
Compatibility		NS	
Uses		Dose	Infusion rate
	Status epilepticus	loading :- 15-20 mg /kg then 100/6-8hr by rate of 30-50ml/min	<u>Loading:-</u> 4 -5.5 amp *200 ml NS over 35 min Then 100 mg/6-8 hr. over 3 min.
Stability		❖ Use within 4 hrs. ❖ not refrigerate	
Precautions		❖ Inject into a large peripheral or central vein through a large-gauge IV catheter. ❖ Flush line with sterile saline before and following each IV injection to avoid local venous irritation caused by alkalinity of solution ❖ Elderly and pt with CV diseases should receive it more slowly.	

Propofol

Strength		20 mg/ml (2%)	
Compatibility		Does not need to be diluted If needed may be further diluted in 5% dextrose to a concentration of ≥ 2 mg/mL.	
Uses		Dose	Infusion rate
	sedation	0.3 mg/kg/hour Increase by 0.3 mg/kg/hour every 5 min. until desired sedation level <u>Usual maintenance</u> 0.3 to 3 mg/kg/hour	0.7 ml/hr $\rightarrow$ 10.5 ml/hr
	Refractory Status epilepticus	<u>Loading dose:</u> 1 to 2 mg/kg with initiation of a continuous infusion of 1.2 mg/kg/hour <u>If breakthrough</u> occur increase infusion rate by 0.3 to 0.6 mg/kg/hour every 5 minutes <u>Dosage range</u> 1.8 to 12 mg/kg/hour (30 to 200 mcg/kg/minute) Withdraw gradually to prevent recurrent status epilepticus.	<u>Loading dose:</u> 3.5 – 7 ml bolus over 5 min Then 4.2 ml/hr. Increase infusion rate by 0.7-1.5 ml /hr. every 5 minutes <u>Dosage range</u> 6 – 42 ml/hr.
Stability		- If transferred to a syringe or other container prior to administration, use within 6 hours. - If diluted in 5% dextrose stable for 8 hours at room temperature	
Precautions		❖ Avoid rapid bolus injection ❖ Shake well before use. Do not use if there is evidence of separation of phases of emulsion. ❖ Do not administer through the same IV catheter with blood or plasma. ❖ Tubing of propofol should be discarded after 12 hours.	

streptokinase

Strength		1.5 million units	
Compatibility		D5W - NS	
Uses		Dose	Infusion rate
	STEMI	1.5 million unit over 1 hr	1.5 million unit * 50ml → over 1 hr
	PE	250,000 U over 30 min then 100,000 U /hr for 24 – 72 hrs	1.5 million unit * 50 ml and give 8 ml over 30min then 3.3 ml/hr for 24-72 hrs
Stability		- Reconstituted solutions should be refrigerated and are stable for 24 hours - At room temp recommend use within 8 hours	
Precautions		❖ Special precautions during preparation	

Thiopental

Strength			500 mg	
Compatibility			D ₅ W, NS	
Uses			Dose	Infusion rate
	General anesthesia	induction	3 to 4 mg/kg IV divided in 2 doses (maximum total dose 500 mg)	amp*50ml→ 20-30 ml divided in 2 doses over 15 sec
		maintenance	25 to 50 mg IV repeated as needed OR continuous IV infusion of 0.2% or 0.4% solution	amp*50ml→3-5ml repeated as needed OR amp*150ml →continuous IV infusion
	Increased intracranial pressure		1.5 to 3.5 mg/kg intermittent bolus IV injection as needed	amp*50ml→10-25 ml bolus over 30 sec as needed
	Seizure		75 to 125 mg IV, single dose; for local anesthetic-induced convulsion, 125 to 250 mg IV over 10 min	amp*50ml→7.5-12.5 ml, single dose
Stability			• 24 hrs	
Precautions			❖ it is advisable to inject a small test dose of 25 to 75 mg (1 to 3 mL of a 2.5% solution) to assess tolerance or unusual sensitivity ❖ only clear reconstituted solutions should be administered	

References

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Notes

- All infusion rates are based on body wt. =70kg
- Clinical responsibility remains with the prescribing doctor.

☺ For any Suggestions , please don't hesitate to contact at

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